

Capturing, Modeling, Rendering 3D Objects

“Capture and create photorealistic models of real-world structures (e.g., objects, buildings, environments, etc) and render them interactively.”



Applications

- Historical Site Preservation



Frank Lloyd Wright
Fallingwater House, PA

Thomas Jefferson
Monticello, VA

Inside Independence Hall,
Philadelphia, PA

Applications

- Historical Site Preservation
- Education and Remote Teaching



Tajmahal, India

Forbidden City, China

Machu Picchu, Peru

Applications

- Historical Site Preservation
- Education and Remote Teaching
- Simulation and Training



Military Training

Architectural Modifications
and Simulations

Entertainment

Traditional Modeling Approach

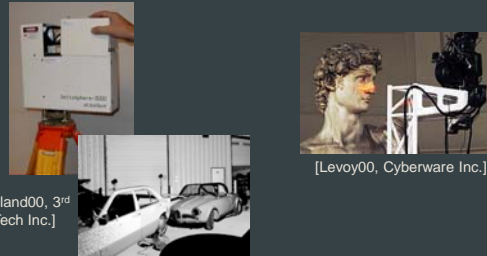
- Manually create a 3D model and render using illumination algorithms
 - Time consuming task
 - Real-time rendering lacks photorealism, too “clean”



[Bastos99]

Laser Scanning Approach

- Perform laser scans
 - Time consuming and only practical to obtain a few datasets
 - Difficult to acquire illumination effects, e.g. specular highlights



[Nyland00, 3rd
Tech Inc.]

[Levoy00, Cyberware Inc.]

Computer Vision Approach

- Calculate pixel correspondences and extract geometry
 - Not robust
 - Difficult to acquire illumination effects, e.g. specular highlights

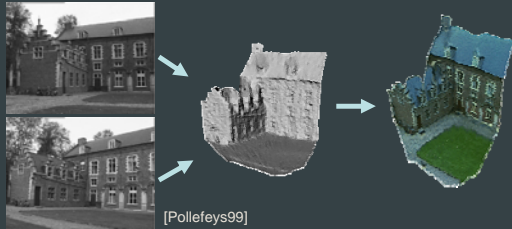


Image-Based Rendering

- Resample images from a set of pictures
 - Typically static environments
 - Large storage requirements

